

INSTRUCTIONS

LABORATORY OVENS

<u>MODEL</u>	<u>MAXIMUM OPERATING TEMPERATURE</u>
LG1	500°F (260°C)
LG3	500°F (260°C)
LG5	500°F (260°C)

**LABORATORY OVEN (DIGITAL) GENERAL INSTALLATION, OPERATION AND
MAINTENANCE INSTRUCTIONS FOR
MODELS LG1, LG3 & LG5**

TABLE OF CONTENTS

1	SHIPPING DAMAGE AND HANDLING
2	PROPER OVEN APPLICATION
	2-1 General
	2-2 Flammable Solvents
	2-3 Combustible Material
	2-4 Personnel Hazards
	2-5 Maintenance and Inspection
3	INSTALLATION
	3-1 Location
	3-2 Building Considerations
	3-3 Clearance
	3-4 Ventilation
	3-5 Exhaust Ductwork
	3-6 Thermometer
	3-7 Electrical
4	PRIOR TO PLACING OVEN IN SERVICE
5	PROCESSING
6	SAFETY EQUIPMENT
7	MAINTENANCES
8	TROUBLESHOOTING
9	APPENDIX A – REFERENCES
10	APPENDIX B – MINIMUM PERIODIC MAINTENENCE REPORT
11	APPENDIX C - PARTS LIST
12	APPENDIX D – WARRANTY AND LIMITATIONS OF REMEDIES

These GENERAL INSTRUCTIONS have been written for three models of ovens, therefore, some components referred to may not be present on your specific piece of equipment.

1 SHIPPING DAMAGE AND HANDLING

DO NOT RETURN DAMAGED MERCHANDISE TO US. FILE YOUR CLAIM AS OUTLINED BELOW

This merchandise has been thoroughly inspected and carefully packed before leaving our plant. Responsibility for its safe delivery was assumed by the carrier at the time of shipment. Claims for loss or damage to the contents must be made with the carrier, as follows:

1-1 VISIBLE LOSS OR DAMAGE

Any external evidence of loss or damage must be noted, at the time of delivery, on the freight bill or express receipt and signed by the carrier's agent. Failure to adequately describe such external evidence of loss or damage may result in the carrier refusing to honor a damage claim. Make a written request for inspection by the carrier's agent within fifteen days of the delivery date. Review the inspection report and do not sign it unless it adequately describes the damage.

A claim must be filed with the carrier since such damage is the carrier's responsibility.

1-2 CONCEALED LOSS OR DAMAGE

Concealed loss or damage means loss or damage which does not become apparent until the merchandise has been unpacked. The contents may be damaged in transit due to rough handling even though the carton may not show external damage. When the damage is discovered upon unpacking, contact the carrier and make a written request for inspection by the carrier's agent within fifteen days of the delivery date. Review the inspection report and do not sign it unless it adequately describes the damage.

A claim must be filed with the carrier since such damage is the carrier's responsibility. By following these instructions carefully, we guarantee our full support for your claims to protect you against loss from concealed damage.

1-3 RETURNING DAMAGED EQUIPMENT

Damaged equipment will not be accepted at our factory unless we have been advised and instructions provided on how it should be returned. A copy of the freight claim must be provided prior to returning the equipment.

1-4 HANDLING

After inspection, store and handle all equipment and components in their original crates until ready for installation. Handle with care. The equipment may be heavy, but some

components are delicate. If the equipment is to be stored, keep it in the original crates and store in a location free from excessive dust, heat and moisture until ready for installation.

2 PROPER OVEN APPLICATION

2-1 GENERAL

2-1.1 While ovens are versatile, they are usually purchased with a specific application in mind. If your process has changed significantly or if you should have reason to doubt that a specific application is a proper use of the equipment, consult the factory before proceeding.

2-1.2 Explanatory Material (Annex A1.1) of the National Fire Protection Association Publication 86 "Standard for Ovens and Furnaces" states; in part:

"Explosions and fires in fuel-fired and electric heat utilization equipment constitute a loss potential in life, property and production.

Most failures can be traced back to human error. The most significant failures include inadequate training of operators, lack of proper maintenance, and improper application of equipment."

2-1.3 To protect the oven, oven contents, property and personnel, a responsible person should be in attendance during operation. Do not operate the oven unattended. Special attention must be paid to:

- Setting correct temperature.
- Placing flammable solvents in oven; these ovens are not designed for that purpose.
- Placing combustibles in an oven that does not have adequate fire protection.
- Allowing the product to remain in the oven too long, thereby encouraging combustion.
- Using an oven for a process other than that for which it was designed.

2-2 FLAMMABLE SOLVENTS

2-2.1 This oven is not equipped for handling flammable solvents. Do not place items that produce flammable solvents or vapors in the oven, such as, but not limited to, paint, ink, solder mask, adhesive or other coatings. Introduction of such items into the oven may result in fire and/or explosion.

- 2-2.2 It is the user's responsibility to ensure that flammable solvents will never be present in the oven and that the operating temperature does not exceed the maximum rated temperature of the oven.
- 2-2.3 In areas outside of the oven where flammable solvents may be present, trained operators will make provisions to exhaust these vapors to the atmosphere to prevent them from entering the oven or collecting inside the oven and creating a flammable mixture.

2-3 COMBUSTABLE MATERIAL

- 2-3.1 Avoid the introduction of combustible materials (such as paper, cardboard or wood) into the oven. Such materials might cause a fire. Do not use combustible racks, trays, holders, spacers, etc. Periodically, clean all combustible material from non-combustible racks, trays, holders, spacers, etc. If combustible products must be processed in an oven, take precautions to ensure that the operating temperature does not exceed the ignition temperature of the product.
- 2-3.2 Ovens containing or processing combustible materials (including combustible drippings or deposits) should either be in an area where a fire would not cause damage or should be equipped with an automatic fire protection system. This includes areas in exhaust ducts that could accumulate combustible material. Fire protection systems should be installed in accordance with the applicable National Fire Protection Guidelines:
- Sprinkler Systems in accordance with NFPA 13
 - Water Spray Systems in accordance with NFPA 15
 - Carbon Dioxide Extinguishing Systems in accordance with NFPA 12
 - Foam Extinguishing Systems in accordance with NFPA 11
 - Dry Chemical Extinguishing Systems in accordance with NFPA 17
 - Water Mist Systems in accordance with NFPA 750

The extent of protection required will depend upon the construction and arrangement of the oven as well as the materials handled. Fixed protection, such as automatic sprinklers or other types of fire extinguishing systems, should be designed and installed by a qualified contractor.

- 2-3.3 Drip pans shall be provided upon request to collect any combustible materials that may accumulate beneath the product. Drip pans must be a minimum of 2" above perforated bottom of oven workspace and allow 2" clearance around the edges. A maintenance program must be developed to remove any such

accumulation before a dangerous build up occurs. If you cannot acquire drip pans locally, contact us for a quotation.

2-4 PERSONNEL HAZARDS

- 2-4.1 Heat processing equipment must always be used with caution. Use proper equipment such as insulated gloves, safety goggles and tongs for loading hot equipment. Proper supervision is essential, only allow trained personnel to operate the oven.
- 2-4.2 Always remember you are working with elevated temperatures.
- Do not touch surfaces - they could be hot, and burns could result.
 - Do not breathe hot oven air. Heated air could burn lungs.
 - Many items become dangerous when heat is applied. An explosion or fire could result. Make sure you know what you are putting in the oven can be heated safely at the oven operating temperature.
 - Heaters or surfaces close to heaters will be at a higher temperature than controller setpoint, keep these surfaces clean and clear of material buildup.
- 2-4.3 Disconnect power before servicing equipment by unplugging from electric outlet. Ovens operate under high voltage and electrical shock is possible. Follow proper lockout procedures.
- 2-4.4 Do not operate mechanical or electrical equipment with guards removed. Operating with guards removed could result in bodily injury.

2-5 MAINTENANCE AND INSPECTIONS

- 2-5.1 Regularly scheduled inspection and maintenance of all safety devices shall be performed by users. Failure to do this may result not only in fire or explosion damage but also contribute to accidental shutdowns and loss of production. See Section 7 – “Maintenance” and Appendix B – “Minimum Periodic Maintenance Report”.
- 2-5.2 Users shall perform regularly scheduled inspections of the oven interior, heat chamber and ducts to determine the need for cleaning and repair. Failure to do regular inspections may result in internal fires or component failure resulting in oven damage and loss of production.
- 2-5.3 It shall be the sole responsibility of the user to establish, schedule and enforce the frequency of and the extent of the inspection/maintenance program (as well as performing corrective actions) because only the user can know what the actual operating conditions are. Contact your insurance authority, Factory

Mutual or the National Fire Protection Association, whose addresses are in Appendix B, for more information on inspection/maintenance programs.

2-6 RETROACTIVITY

The Grieve Corporation designed and manufactured this equipment in accordance with the applicable National Codes in effect as of the date of manufacture. It is the responsibility of the end user to update equipment as necessary to comply with future code changes. If you are in doubt, contact the manufacturer to review your equipment design against current National Codes.

3 **INSTALLATION**

3-1 LOCATION

- 3-1.1 Ovens shall be located to protect them from damage by external heat, vibration and mechanical hazards.
- 3-1.2 Ovens should be located to minimize exposure to power equipment, process equipment and sprinkler risers. Maintain unrelated stock and combustible materials at a fire-safe distance, not less than 2-1/2 feet from an oven or ductwork.
- 3-1.3 Ovens should be located to minimize exposure to people from the possibility of injury from fire, explosion, asphyxiation, and hazardous materials and should not obstruct personnel travel to exit ways.
- 3-1.4 Ovens should be located to prevent an ignition source to flammable coating dip tanks, spray booths, storage and mixing rooms for flammable liquids, or exposure to flammable vapor or combustible dust clouds. Ovens should not be in hazardous (classified) locations unless they are designed to comply with the applicable requirements of NFPA 70 "National Electrical Code" (see Appendix A).
- 3-1.5 Protect equipment from corrosive external processes and environments, including fumes or materials from adjacent processes or equipment that produce corrosive conditions when introduced into the oven environment.
- 3-1.6 Install the oven only in an area sheltered from the weather, ovens are not intended for outdoor installation. Unheated shelters may result in non-uniform temperatures or insufficient heat to attain maximum operating temperature. Condensation may also occur, which would damage the steel structure and electrical components.

- 3-1.7 Suitable portable fire extinguishers should be available, and operators trained in their use. All such fire protection equipment should be inspected periodically in accordance with appropriate standards. Reference NFPA 10 “Standard for Portable Fire Extinguishers” (see Appendix A).

3-2 BUILDING CONSIDERATIONS

- 3-2.1 When selecting the location for an oven, consideration must be given to the possibility of fire, building damage and personal injury. Consider hazards such as overheating of material in the oven and escape of exhaust into the workplace.
- 3-2.2 Place the oven on a non-combustible surfaces.

3-3 CLEARANCES

- 3-3.1 Ovens shall be located with adequate space above and on all sides to allow inspection and maintenance. Include provisions for the installation of automatic sprinklers, if applicable.
- 3-3.2 Do not place the oven up against a wall. Provide a minimum air space of three inches (3”) on all sides to allow for air circulation, with additional space provided for ovens operating over 450°F (232°C) to keep temperature at adjacent structures and materials below 160°F (71°C).
- 3-3.3 Do not store material on top of oven. The oven is not designed to carry exterior loads. Also, material may get hot, ignite and cause a fire.
- 3-3.4 The oven doors have spring loaded latches which will allow the doors to open if pressure develops in the oven. Do not restrict door travel. Oven should face away from main aisles, work areas and automatic sprinkler risers, feeds and cross mains.

3-4 VENTILATION

- 3-4.1 Where ovens are in basements or enclosed areas, supply sufficient room ventilation to prevent the hazardous accumulation of vapors from processing.
- 3-4.2 Never restrict fresh air inlets and exhaust outlets.

3-5 EXHAUST DUCTWORK

- 3-5.1 The oven has vent holes in the top. If the oven vented air is to be collected and ducted from the area, it must be in accordance with local codes and

requirements. Exhaust gas temperature is the same as internal oven temperature. Caution must be taken to protect combustible building materials from coming in contact with the hot exhaust stack.

- 3-5.2 Wherever oven ducts or stacks pass through combustible walls, floors or roof, provide noncombustible insulation, or clearance, or both, to prevent combustible surface temperatures from exceeding 160°F (71°C).
- 3-5.3 Where ducts pass through non-combustible walls, floors or partitions, seal the space around the duct with non-combustible material to maintain the fire resistance rating of the barrier. Avoid ducts that pass-through fire walls.
- 3-5.4 Construct ducts entirely out of sheet steel or other non-combustible material capable of meeting the intended installation and conditions of service. The installation shall be of adequate strength and rigidity and shall be protected where subject to physical damage.
- 3-5.5 Ducts handling fumes that leave a combustible deposit shall be provided with clean-out doors. Equip such doors with tight fitting covers. It is important that ovens and ducts be kept clean if they are subject to a build-up of flammable deposits of dust or other combustible debris. The build-up of condensed vapors or combustible debris is a major cause of fires. Frequency of cleaning should be based on never allowing build-up to exceed 1/8" thickness in any location.
- 3-5.6 No portions of the building shall be used as an integral part of the duct.
- 3-5.7 Ducts handling combustible solids shall be designed to minimize the accumulation of solids within the ducts.
- 3-5.8 Exhaust ducts that will contain combustible deposits of any type require automatic sprinklers.
- 3-5.9 Clearance between metal ducts and stored combustible material should be at least 2-1/2 feet. Guards should be installed to ensure this clearance.

3-6 THERMOMETER

- 3-6.1 TC3YT-B4R16 temperature controller offers display accuracy of +/- 0.5% process value or +/-1°C, reading +/-1 digit.

3-7 ELECTRICAL

- 3-7.1 All electrical connections should be made in accordance with the appropriate local and national codes. Refer to NFPA 70 “National Electric Code” (see Appendix A).
- 3-7.2 Properly size the electrical supply using information provided on the oven nameplate. Electric supply must include a safety shut-off such as a circuit breaker or disconnect switch between your power supply and the equipment.
- 3-7.3 Do not remove or change the plug provided. A properly sized circuit and receptacle must be installed.
 - 3-7.3.1 120 Volt Units - Plug into grounded (3 prong) 120-volt outlet. Do not remove ground prong from plug. If no grounded outlet is available, have one installed prior to using this equipment.
 - 3-7.3.2 240 Volt Units - A plug suitable for use with your existing 240-volt receptacle must be installed on the cord provided. Make sure that your existing receptacle and the plug installed provide a secure ground.
- 3-7.4 The oven must be adequately grounded. Where a plug is provided, do not remove the ground prong. Grounding wire must be sized in accordance with local codes. Where more strict codes do not exist, refer to the NFPA 70 “National Electrical Code” (see Appendix A).

4 PRIOR TO PLACING OVEN IN SERVICE

- 4-1 Read the instruction manual carefully.
- 4-2 After installation is complete, replace all covers and guards that have been removed for installation. At no time should the equipment be operated if covers or guards are open, removed, or partially closed.
- 4-3 Check the incoming voltage against that shown on the nameplate.
- 4-4 Check operating current against nameplate rating.
- 4-5 All ovens will produce smoke and odors when first heated. The smoke and odors come from three sources:
 - Surfaces that have not been heated during tests such as shelves
 - Binders that remain in the insulation
 - Moisture that has been absorbed by the insulation

If during the initial run of the oven, the smoke and odors become objectionable, set the temperature at 300°F and allow the oven to remain at 300°F until the smoke is no longer generated. Increase the temperature in steps until it has reached the maximum operating temperature. It may take several days of running at the maximum operating temperature to eliminate all smoke and odors.

If the oven is not heated for an extended period, moisture may accumulate in the insulation. When heated, this moisture will be driven out and the above process may have to be repeated.

- 4-6 Personnel operating, maintaining or supervising shall be instructed and trained in their job functions and shall be required to demonstrate an understanding of the equipment, its operation and safe operating procedures including emergency shutdown.
- 4-7 Operate equipment in accordance with original design parameters.
- 4-8 Inform personnel operating, maintaining, or supervising of the danger of removing, or rendering ineffective, safety devices.

5 PROCESSING

5-1 LOADING AND OPERATION

5-1.1 DO NOT LEAVE THIS EQUIPMENT IN OPERATION UNATTENDED

When using any heat processing equipment there is always the risk of overheating due to a component malfunction. A trained operator should always be present. If this is not possible, the oven should be located where overheating will not cause damage to the building, adjacent stock or could endanger personnel. Special consideration should be made for the potential of smoke damage should a fire ensue. Fire suppression equipment should be installed to protect the oven and building.

5-1.2 When loading an oven, care must be taken to avoid touching or insulating the thermocouple or temperature sensor. Free air movement around this sensor is essential for safe and correct temperature control.

5-1.3 Do not overload the oven. Air circulation is important to the proper operation of an oven. For maximum uniformity, the work should be placed in the middle of the oven workspace and room (1" to 1-1/2") left around the work for vertical air movement.

- 5-1.4 The inside walls of the oven are equipped with shelf slots to adjust the height of independent shelf rails. Select the shelf height to the most desirable height for your process by placing the independent shelf rails in the slats at the desired level and placing the shelf on the shelf rails.
- 5-1.5 This oven is designed for shelf loading, parts must not be placed at the bottom of the workspace. The area below the first level of shelf support is not included in the workspace volume or uniformity as advertised.
- 5-1.6 Leave space between articles on each shelf to allow air to move between parts.
- 5-1.7 Parts should be staggered from one shelf to another, to prevent dead spots in the air pattern.
- 5-1.8 For drying applications, the air circulation damper should be fully open to allow moisture to escape and be replaced by dry room air.
 - 5-1.8.1 For maximum temperature, close the air circulation damper to reduce heat losses.
 - 5-1.8.2 In the medium and lower temperature ranges of the oven, better temperature uniformity will be obtained with the circulation damper open.
- 5-1.9 To turn the oven on, push to “I” of on-off switch in, green light will be turned on. When the oven is not in use, the on-off switch must be turned off pushed to “O” position, the green light turned off. Do not rely on the thermostat to interrupt power to the heating elements indefinitely.

5-2 EMERGENCY SHUTDOWN

- 5-2.1 Press on-off switch to “O” position, green light turned off.
- 5-2.2 Unplug oven.
- 5-2.3 Disconnect power to oven at disconnect switch or circuit breaker.

5-3 TEMPERATURE CONTROL

- 5-3.1 The digital temperature controller offers display accuracy of +/- 0.5% process value or +/-1°C maximum. This value is read by the control thermocouple located in the oven workspace. If it is believed that the temperature controller is not reading accurately, first check the location, cleanliness and connection to the temperature controller of the control thermocouple.

- 5-3.2 Do not operate the oven without a functional heat limiter or an excess temperature interlock. Do not bypass or otherwise defeat the bulb and capillary type excess temperature interlock.
- 5-3.3 Do not attempt to operate your laboratory oven at temperatures above the maximum rating of the oven. Higher temperature units are available-- please contact the factory for information.

5-4 OVER TEMPERATURE PROTECTION

- 5-4.1 Units rated up to 500°F are equipped with a bulb and capillary type excess temperature interlock which is located within the control panel which will cut off heating if the oven temperature exceeds 575°F. The bulb and capillary type excess temperature interlock can be reset by pressing the manual reset button. Operating these ovens at temperatures above their maximum rating or restricting free movement of the heated air from the heat chamber (located below the first row of shelf supports) will result in these devices opening the circuit to the heating elements.
- 5-4.2 Do not operate the oven without an excess temperature interlock. Do not bypass or otherwise obfuscate the excess temperature interlock.

6 SAFETY EQUIPMENT

- 6-1 Most explosions and fires in ovens can be traced back to human error. It should be noted that:
 - 6-1.1 For the protection of personnel and property, careful consideration should be given to the supervision and monitoring of conditions that could cause, or could lead to, a real or potential hazard to any installation.
 - 6-1.2 The presence of safety equipment on an installation cannot, alone, ensure absolute safety of operation.
 - 6-1.3 There is no substitute for a diligent, capable, well-trained operator.
 - 6-1.4 Highly repetitive operational cycling of any safety device can reduce its life span.
- 6-2 Temperature controllers, switches and electric relays should not be used as substitutes for electrical disconnects or unplugging equipment.

- 6-3 Regularly scheduled inspection, testing, and maintenance of all safety devices shall be performed. (See Section 7 - Maintenance and Appendix B - Minimum Periodic Maintenance Report)
- 6-4 Safety devices shall not be removed or rendered ineffective by bypassing them electrically or mechanically.
- 6-5 All units are equipped with a bulb and capillary type excess temperature interlock.
 - 6-5.1 Operating at temperatures above the setting of this device will result in opening the circuit to the heating elements.
 - 6-5.2 These devices must be reset before power is restored to the heating elements.
 - 6-5.2.1 Resetting of bulb and capillary type excess temperature interlock requires removal of the door assembly and the front face of the control panel.
 - 6-5.3 These devices are installed to protect the oven from a runaway condition. It is the user's responsibility to monitor any product in the oven if over-heating can cause damage to the product or cause a fire.
 - 6-5.4 The cause of over-heating should be determined and corrected before processing is continued. Do not remove or bypass excess temperature limit interlock.
- 6-6 No matter how much safety equipment is provided on the oven, it cannot protect the operator, other personnel or property from unsafe conditions caused by poor judgement or misapplication. Use common sense for safe operation. If in doubt, contact the factory. Review the process periodically to ensure the oven is being used as originally intended.

7 MAINTENANCE

- 7-1 For safe oven operation, a preventative maintenance program must be developed and followed for each individual oven application. The user should review recommendations from their insurance underwriters. We suggest the review of Factory Mutual (FM) Specification 6-9 on Industrial Ovens and Dryers and the National Fire Protection Association (NFPA) Specification 86 on Ovens and Furnaces. We also recommend a Maintenance Report be developed which lists tests and inspections performed. A copy of this report should be kept on file for future review. At a minimum, the unit should be fully inspected annually.

A Minimum Periodic Maintenance Report is provided in Appendix B as an example for developing your own periodic maintenance schedule and report.

7-2 Disconnect electric power and any other energy source before servicing equipment. Ovens operate under high voltage and electrical shock is possible. Follow proper OSHA required lockout procedures.

7-3 Removing the heat chamber guard at the bottom of the workspace will expose high voltage connections. Do not operate with this guard, or any other mechanical or electrical components that have guards removed. Operating with guards removed could result in bodily injury.

7-4 RECOMENDED MAINTENANCE ITEMS

It shall be the sole responsibility of the user to establish, schedule and enforce the frequency of and the extent of the inspection/maintenance program (as well as the corrective action to be taken) because only the user can know what the actual operating conditions are. The tests should be conducted by personnel who are familiar with the equipment. It is usually better that maintenance personnel from mechanical and electrical departments check the equipment rather than regular oven operators. These additional hands and eyes may catch things that may be otherwise overlooked.

The following are minimum maintenance items we recommend be covered. Your list will vary depending upon the specific oven and operating conditions.

7-4.1 Application

7-4.1.1 The user is responsible for ensuring that the oven process has not changed from the conditions for which it was originally purchased, and that the oven is not modified. It is the user's responsibility to ensure that flammable solvents are not placed in the oven, and the operating temperature does not exceed the maximum design temperature.

7-4.2 Electrical

7-4.2.1 Inspect power cord and plug for damage; repair or replace as necessary.

7-4.2.2 Periodically inspect contacts in open thermostats for foreign material, signs of wear, or sticking; clean or replace as necessary.

7-4.3 Oven Body

- 7-4.3.1 Do not allow accumulation of combustible material or other foreign material in the workspace, heat chamber (including heating elements) ductwork, air inlets, vent outlets, control enclosures, door latches, and door hinges. Care must be taken in cleaning any combustible build-up to avoid creating a source of ignition (spark). Scraping with non-sparking tools is suggested. Lint and dust should be removed by vacuum cleaning. Blowing with compressed air or steam should be avoided if there is a possibility of an explosion from a combustible dust cloud.
- 7-4.3.2 Do not allow accumulation of combustible material on work holders, drip pans or on floor of oven.
- 7-4.3.3 Temperature control and excess temperature control sensing bulbs or bimetal must be inspected periodically for damage. The location of these cannot be changed.

7-4.4 Duct Work

- 7-4.4.1 It is important that ovens are kept clean. If they are subject to a build-up of combustible deposits of dust or other combustible debris, they must be periodically cleaned. The build-up of condensed vapors or combustible debris is a major cause of fires.

7-4.5 Doors/Gaskets

- 7-4.5.1 The oven doors should be inspected regularly to see that latches are holding the door firmly and uniformly against the oven providing a maximum sealing force.
- 7-4.5.2 The door should be inspected for damage which would allow excessive leakage of hot air. The gasket should be replaced when damaged or when it cannot maintain an adequate seal.
- 7-4.5.3 The door and associated spring-loaded latches should be checked periodically.

7-4.6 Temperature Control

- 7-4.6.1 Run oven at predetermined setting and compare temperature at thermometer to previous tests. Significantly higher temperatures could indicate the temperature controller is failing.

7-4.7 Location

- 7-4.7.1 The user is responsible for determining that facility changes in the vicinity of the oven have not created a hazardous condition. Specifically, the oven should be protected from external heat, vibration, mechanical hazards and corrosive environment.
- 7-4.7.2 Processes involving flammable liquids or creating explosive vapor or combustible dust clouds must not be located near the oven.
- 7-4.7.3 Portable fire extinguishers located in the vicinity of the oven must be inspected periodically.
- 7-4.7.4 Fire suppression system installed in the oven should be periodically tested. All sprinkler heads in oven or located in work area should be periodically inspected and cleaned.

8 TROUBLESHOOTING

8-1 NO HEAT

8-1.1 Oven has run over-temperature.

- 8-1.1.1 Check continuity of excess temperature interlock. Interlock can be reset by pressing the red manual reset button. If excess temperature interlock will not reset, it needs to be replaced.

8-1.2 On/Off Switch

- 8-1.2.1 Check for a defective switch.

8-1.3 Fuse Burned Out or Circuit Breaker Tripped

- 8-1.3.1 Make sure there is power to the oven.

8-1.4 Burned-Out Heating Element

- 8-1.4.1 Check that there is power to each heating element and that elements are not open.

8-2 REDUCED OVEN TEMPERATURE

8-2.1 Excessive Exhaust

8-2.1.1 The amount of heated air removed from the oven may be excessive and result in a reduced operating temperature. In this case, the oven's heat will be running continuously. This can be corrected by reducing the exhaust until the maximum operating temperature is achieved.

8-2.2 Door Leakage

8-2.2.1 A poorly adjusted door or damaged door gaskets could result in excessive heat loss around the doorway. Adjust door or repair/replace gasket.

8-2.3 Improper Line Voltage

8-2.3.1 Measure voltage at the oven to determine if an excessive voltage drop will cause reduced power input to the heating elements on an electrically heated oven. This could be caused by too many devices connected to the same circuit or by undersized wiring between the oven and the power source. Measure the voltage with the oven heating elements on and all other equipment on the same circuit operating.

8-3 WIRING DIAGRAMS

8-3.1 See *APPENDIX E* for wiring diagram.

9 **APPENDIX A – REFERENCES**

The following sources of additional information are referenced in these instructions. This is not presented as a complete list of all possible reference sources.

9-1 Factory Mutual Engineering Corporation
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, Massachusetts, 02062

Attn: Publications Order Processing
Specifications 6-9, Industrial Ovens and Dryers

9-2 National Fire Protection Association
1 Batterymarch Park Quincy,
Massachusetts 02169-7471

Most Current Issue of:

- 9-2.1 NFPA 86 - Ovens and Furnaces
- 9-2.2 NFPA 70 - National Electric Code
- 9-2.3 NFPA 10 - Standard for Portable Fire Extinguishers
- 9-2.4 NFPA 11 - Standard for Low-Expansion Foam
- 9-2.5 NFPA 12 - Standard on Carbon Dioxide Extinguishing Systems
- 9-2.6 NFPA 13 - Standard for the Installation of Sprinkler Systems
- 9-2.7 NFPA 14 - Standard for the Installation of Standpipe and Hose Systems
- 9-2.8 NFPA 15 - Standard for Water Spray Fixed Systems for Fire Protection
- 9-2.9 NFPA 17 - Standard for Dry Chemical Extinguishing Systems
- 9-2.10 NFPA 17A-Standard for Wet Chemical Extinguishing Systems
- 9-2.11 NFPA 25 - Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems NFPA 30 - Flammable and Combustible Liquids Code

10 APPENDIX B – MINIMUM PERIODIC LABORATORY INSPECTION REPORT

Model: _____ Serial No.: _____

Inspected By: _____ Date: _____

BEFORE APPLYING POWER CHECK THAT:

1. _____ No changes in process have been made including types of materials processed and temperature:
Oven originally purchased for (reference previous Inspection Report):

Oven being used for: _____

2. _____ No flammable solvents are involved in the process.

3. _____ All thermostats with open contacts have been inspected for foreign material, wear or sticking.

4. _____ Oven interior inspected, cleaned, and all foreign material removed from:
 _____ Floor
 _____ Heat chamber (including heating elements)
 _____ Control enclosure and components
 _____ Door hinges

5. _____ Remove and clean all drip pans. Inspect and clean all work racks, trays, holders or spacers.

6. _____ Locate temperature controller sensors and inspect for damage. Make sure the sensor is in free air and not touching anything.

7. _____ Locate manual reset bulb and capillary type excess temperature limit interlock sensor, inspect for damage and make sure located in free air.

8. _____ Inspect heating elements for contamination, distortion and adequate support.

9. _____ Doors are free to move and not obstructed.

10. _____ Exhaust ductwork from the oven (if applicable) has been inspected and cleaned; all foreign material has been removed.

11. _____ Inspect door latches and check for freedom of movement.

APPLY POWER AND CHECK:

- 12.____ Supply voltage agrees with oven nameplate - measure and record: _____.
- 13.____ Set oven at number _____,
Temperature on controller display fluctuates from _____ to _____.
Compare to previous test report.

LOCATION:

- 14.____ No changes in the oven area have created hazardous conditions such as external heat, vibration, mechanical hazard or corrosive environment.
- 15.____ No process change has resulted in flammable liquids or explosive vapors, or dust cloud being stored or produced in vicinity of oven.
- 16.____ Portable fire extinguishers in the area have been inspected.
- 17.____ Fire suppression systems, such as sprinkler systems, have been inspected.
- 18.____ Sprinkler heads in work area have been inspected and cleaned.

TRAINING

- 19.____ Review job function, oven operation and emergency shutdown with operators and supervisors.

11 APPENDIX C – REPLACEMENT PARTS

MODEL LG1 ONLY	DEVICE ID:	PART NUMBER:
Interior Shelf		LG1-0SV
Shelf Angle		LG1-2S
Heating Element (120 V, 400 W)	HTR1, HTR2	HELX1
Silicone Rubber Door Gasket (62")		GSKTRBD
Fiberglass Tape Gasket (50")		GSKTTP1
Door		DOORLG1

MODEL LG3 ONLY	DEVICE ID:	PART NUMBER:
Interior Shelf		LG3-0SV
Shelf Angle		LG3-2S
Heating Element (120 V, 800 W)	HTR1, HTR2	HEG120
Silicone Rubber Door Gasket (83")		GSKTRBD
Fiberglass Tape Gasket (69")		GSKTTP1
Door		DOORLG3

MODEL LG5 ONLY	DEVICE ID:	PART NUMBER:
Interior Shelf		LG5-0SV
Shelf Angle		LG5-2S
Heating Element (120 V, 800 W)	HTR1, HTR2	HEG120
Silicone Rubber Door Gasket (99")		GSKTRBD
Fiberglass Door Gasket (78")		GSKTTP1
Door		DOORLG5

ALL MODELS (LG1, LG3, LG5)	DEVICE ID:	PART NUMBER:
20 Gauge Thermocouple Lead Wire	T/C1	J20_2_G
On/Off Switch	SW1	R5BBLKGRNFF1
Digital Temperature Controller	TC1	TC3YT-B4R16
Electrical Power Cord and Plug	PLG1	PWRCRD14GA
Bulb and Capillary Type Excess Temperature Interlock (575°F)	ETC1	LCH-C70360000
Bumper Feet		RF8T
Top Hinge		LG-3TH
Bottom Hinge		LG-3BH
Door Handle		EBP.140-8-FLX-C1
Door Latch		H3-0095-E
Door Catch		H2-0797-001-1

12 APPENDIX D – WARRENTY AND LIMITATIONS OF REMEDIES

Any equipment sold by GRIEVE is warranted for one (1) year after the Purchaser receives the equipment to be free from defects of material and workmanship. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF; WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, GRIEVE EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER=S EXCLUSIVE REMEDY FOR ANY BREACH OF THIS WARRANTY SHALL BE FOR THE REPAIR OR REPLACEMENT (AT GRIEVE=S OPTION) OF DEFECTIVE EQUIPMENT OR PART.

Parts under warranty are shipped via ground transportation. Express or expedited shipping costs are the sole responsibility of the customer. In order to obtain repair or replacement under this warranty, the user must deliver the defective product or part to GRIEVE’S factory on a prepaid basis promptly after discovery of the defect. GRIEVE’S warranty ceases to be effective if the equipment is altered or modified, repaired other than by people authorized by GRIEVE, misused, used by any person in an unsafe or unreasonable manner or used other than in accordance with GRIEVE written instructions. Although GRIEVE makes no additional or extended warranty with respect to thermostats, recorders, control equipment or other accessories, to the extent such items may also be warranted by their respective manufacturers, those warranties are passed on to you by GRIEVE as agent of the respective manufacturers and not as a separate warrantor.

In no event shall GRIEVE be liable for any direct, indirect, special, incidental or consequential damages hereunder, whether such damages are sought based on breach of warranty, breach of contract, negligence, strict liability in tort, or any other theory of legal liability.

INSPECTION RECORD

OVEN MODEL (Check One)

- LG1
- LG3
- LG5

POWER SUPPLY (Check One)

- 120 Volts
- 240 Volts

ASSEMBLED BY: _____ INSPECTED BY: _____

PACKED BY: _____ SERIAL NO.: _____

(NOTE: If this oven is in any way defective, please return a copy of this Inspection Record with your report.)

13. APPENDIX E: WIRING DIAGRAM

